

Work Order ID 63592

Thursday, November 04, 2010 11:45:21 AM



Page 1

Item ID: D350-748-101

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Installation, High Fwd

Start Date: 11/4/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 11/25/2010 Req'd Qty: 1.00

Customer:

Reference:

Run Start



Approvals: Process Plan: *M*

Date: *10-11-04*

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr	Revision Nbr
D350-748-141	Rev E

100 DOCUMENT CONTROL 0.00



DC

Memo

0.00

Document Control

Photocopy bluefile & type labels per PPPD350-748-101 CHG001

Sulorlu

Handwritten signature and date: 10-12-9

110 BENDING MACHINE - CROSSTUBES 0.00



CNC Bend 1

Memo

0.00

CNC Delta 100 Bender

Bend tube as per Dwg D350-748-141 using CNC bender program D350F and Folio FT

Handwritten signature

Handwritten date: 10-12-9

120 QC15- Crosstube Dimensional Check 0.00



QC

Memo

0.00

Quality Control

Handwritten signature and date: 10-12-09

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

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Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

125

0.00



HandFXtube

Memo

0.00

Hand Finishing Crosstubes

Stress relief

Heat treat crosstube as per QSI010 4.3

Temp: 375

Start time: 1h30

Finish time: 5h30

SAD
10-12-90

127

QC5- Inspect part completeness to step on W/O

0.00



QC

Quality Control

See FAT sheet
Memo

0.00

for stress relief

8/10/12/13

(X)

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Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

130



Crosstubes

Crosstubes

0.00

Memo

0.00

Crosstubes

1-Drill Tube as per Dwg D350-748-141 Using DT8876 A,B & C Drill Jigs,
Set-up drill table as per QSI 010

2-Deburr

3-Engrave Part # and Batch # as per Dwg D350-748-141

4-Remove all marks from tube within limits of D350-748-141

5- Apply a light coat of LPS3 on the interior of tube
Batch: 109956

SAD 10-12-15

SAD 10-12-22 (1)

140



QC

Quality Control

QC5- Inspect part completeness to step on W/O

0.00

Memo

0.00

CHECK 10 DEG HOLES WITH DT8876E (EUROCOPTER CLAMP)

140.5

DEFLECT tube for
NDT (CPI)

10/12/21

issue R10 to acurien for NDT P1013181

rec'd + inspect attached report NDT to W10

CY 10/12/21
11/14/21 (1)

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Stop



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--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

150

Outsource process-Cadplate per QSI017 4.1.9.1

0.00



Outsource3

Memo

0.00

Outsource process - Cad plate

Issue P/O:

13189

Stress relief at 375° for 5 hours

Magnetic Particle Inspect per ASTM E1444

Cadium Plate per AMS-QQ-P-416B, Class 1, Type 2

Embrittle relief at 375° for 8 hours, Chromate Treat

Possibe Supplier: Southwest United Industries

Ensure Certificate of Conformity is attached

CZ 10/12/22 ①

160

Receive & Inspect for Damage & Mat'l Certs

0.00



Packaging

Memo

0.00

Packaging

Ensure certificate of conformity is attached

11/10/12 ①

170

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

Span = 81.650

twist = 0.06"

Sub 11/10/24 / 11.06.24

Issue P/O to Green LPI as per ASTM 1417 level 2 and LPI as per QSI 038

P/O.13367

CZ 11/10/26 ①

rec'd + inspect + attached cofc to w/o

11/07/24

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Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180		0.00							
	SprayPaint								
SprayPaint	Memo	0.00							
Spray Painting	1-Prime inside crosstube as per QSI 005 4.2 2-Prime Outside of Tube as per Dart QSI 005 4.2								
190		0.00							
	QC14- Inspect Spray Paint								
QC	Memo	0.00							
Quality Control	Then, Wrap in plastic bag to protect from scratches								
200		0.00							
	Crosstubes								
Crosstubes	Memo	0.00							
Crosstubes	1-Install Ground wire Insert, then insert screw and washer 2-Install Abrasion strips as per Dwg D350-748-141 & QSI 035. 3-Install supports Using Dt8876 as per Dwg D350-748-141, Torque to 60-80 IN-LBS								

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Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

210

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Sulobos

70

Quality Control

220

Pick Kit

0.00



Packaging

Memo

0.00

11/12/10

Packaging

230

QC4- 100% Inspect kits for completeness

0.00



QC

Memo

0.00

Sulobos

70

Quality Control

W/O:		WORK ORDER CHANGES					
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Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

240

0.00



Packaging

0.00

Packaging

Memo

Identify and pack for shipping as per PPP D350-748-101

Location: 13PPP Rev: 13

Packaging

250

0.00



QC21- Final Inspection - Work Order Release

0.00

QC

Memo

Quality Control

11/02/11 1111/02/11 11MF11-02-11

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Required Date: 11/25/2010

Required Qty: 1.00

Comments: IPP Rev:A New Issue 06-07-05 JLM
 IPP Rev:B Update qty of MS21042L5 06-09-12 KJ
 IPP Rev:C Rev B 07-11-15 DD
 IPP Rev D Combined manufacturing 08.04.02 EC verified by: DD
 IPP Rev:E 08-06-24 revD as per dwg DD verified by:EC IPP Rev:F
 10.08.04 added QS1010 4.3 DD verf:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D350-748-141TRN		Manufactured	No			110	Each	0.0000	1	1			
													
Crosstube Turning Detail						361137				SAD	10-12-09		
ALS4-1032-225		Purchased	No			200	Each	4,680.000	1	1			
													
Insert												11.02.08	
				<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>					
				PK011		4680							
				110768		4680							
AN960JD10	NAS1149D0363J	Purchased	No			200	Each	8.0000	1	1			
													
Washer												11.02.08	
				<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>					
				ST		6							
				107715		6							
				ST335		2							
				105792		2							
D2856-400		Manufactured	No			200	f	175.2500	1.181	1.243158			
													
Abraison Strip												11.02.08	
				<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>					
				ST403		175.2500421							
				56626		0.00004211							
				59920		175.25							

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Picklist Print

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Work Order ID: 63592

Parent Item: D350-748-101

Parent Item Name: Crosstube Installation, High Fwd

Start Date: 11/4/2010

Required Date: 11/25/2010

Start Qty: 1.00

Required Qty: 1.00

D3502-1
Support
Manufactured No

200 Each 48.0000 2 2

Location Loc Qty Loc Code

ST063	24	
61206	12	
61843 X1	12	
ST066	24	
50287 X1	23	
52903	1	

11.02.08

MS21920-20
Clamp (per MIL-DTL-8783C)
Purchased No

200 Each 57.0000 2 2

Location Loc Qty Loc Code

LG	57	
112624	2	
114687	1	
115057	4	
115736	50	

11.02.08

MS27039-1-10
Screw
Purchased No

200 Each 131.0000 1 1

Location Loc Qty Loc Code

ST291	131	
112794	3	
112940	28	
115935	100	

11.02.08

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Start Date: 11/4/2010

Required Date: 11/25/2010

Start Qty: 1.00

Required Qty: 1.00

AN4-41A

Purchased

No

220

Each

252.0000

8 8



Bolt

Location

Loc Qty

Loc Code

ST360

252

111424

4

113359

1

114941

57

115108

100

115374

40

115703

50

AN4-6A

Purchased

No

220

Each

956.0000

16 16



Bolt

Location

Loc Qty

Loc Code

ST356

956

112933

96

113149

17

115108

143

115457

500

115936

200

AN5-32A

Purchased

No

220

Each

252.0000

4 4



Bolt

Location

Loc Qty

Loc Code

ST340

252

114405

42

115016

50

115108

50

115589

60

115698

50

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Required Date: 11/25/2010

Start Qty: 1.00

Required Qty: 1.00

AN960JD416 NAS1149D0463J Purchased No

220 Each 24.0000 32 32



Washer



M116304 11/2/10

Location

Loc Qty

Loc Code

ST300

24

113288

24

AN960JD516 NAS1149D0563J Purchased No

220 Each 34.0000 8 18



Washer



M114742 M116540 11/2/10

Location

Loc Qty

Loc Code

ST

34

103694

18

107534

12

109287

4

D3500-1 Manufactured No

220 Each 31.0000 4 4



Saddle



11/2/10

Location

Loc Qty

Loc Code

ST424

31

55605

2

60489

4

61650

25

W/O:		WORK ORDER CHANGES					
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Start Date: 11/4/2010

Required Date: 11/25/2010

Start Qty: 1.00

Required Qty: 1.00

D3501-1

Manufactured No

220

Each

410.0000

16



Bushing



11/2/10 SL

Location

Loc Qty

Loc Code

ST066

410

45402

15

45918

112

48268

3

53779

20

61196

100

61837

60

61984

100

15x

1x

MS21042L4

Purchased

No

220

Each

2,801.000

24



Nut



24 11/6/10 SL

Location

Loc Qty

Loc Code

ST300

2801

113422

25

114523

8

115108

22

115589

1646

115621

1100

MS21042L5

Purchased

No

220

Each

731.0000

4



Nut



4 11/2/10 SL

Location

Loc Qty

Loc Code

ST139

26

114813

26

ST300

705

115156

205

115594

500

4

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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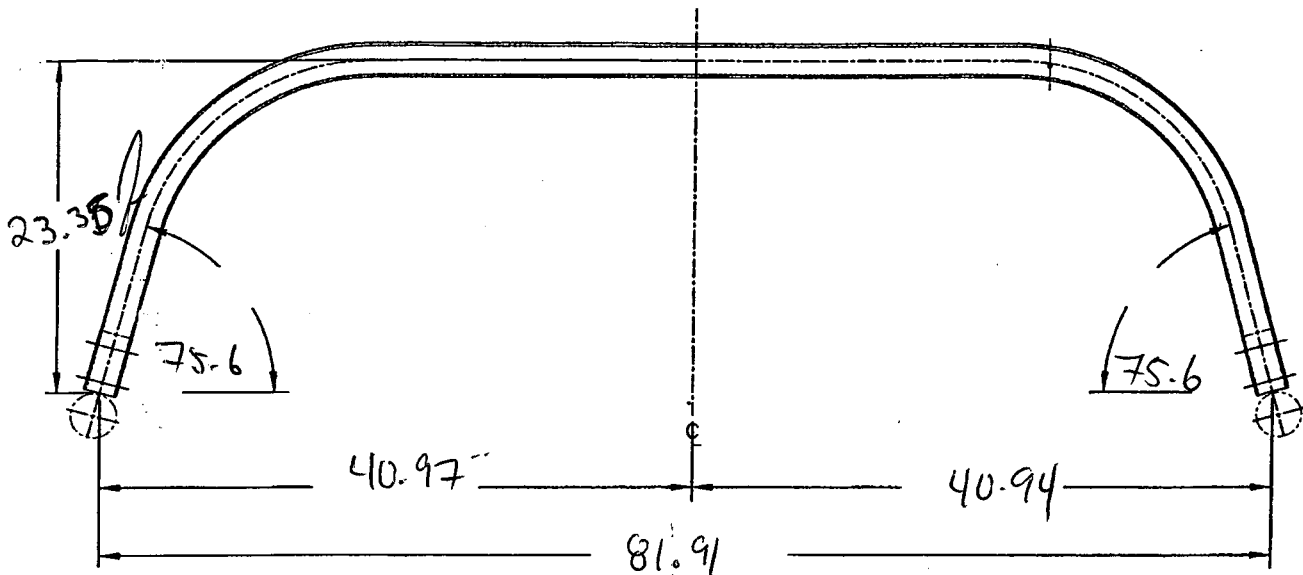
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DART AEROSPACE LTD		Work Order:	43592
Description: Crosstube High Fwd (AS350/355)		Part Number:	D350-748-101
Inspection Dwg: D350-748-141 Rev: E		Page 1 of 1	

Required Dimension	Min	Max
Height	23.13	23.37
1/2 Span	40.78	41.02
Angle	75	77
Total Span	81.56	82.04



Comments
- 0.125" twist from cuff to cuff
- No crushing or buckling present.

QC15 Inspection	
Date	10-12-09

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	10.08.23	Dwg Rev updated	KJ	

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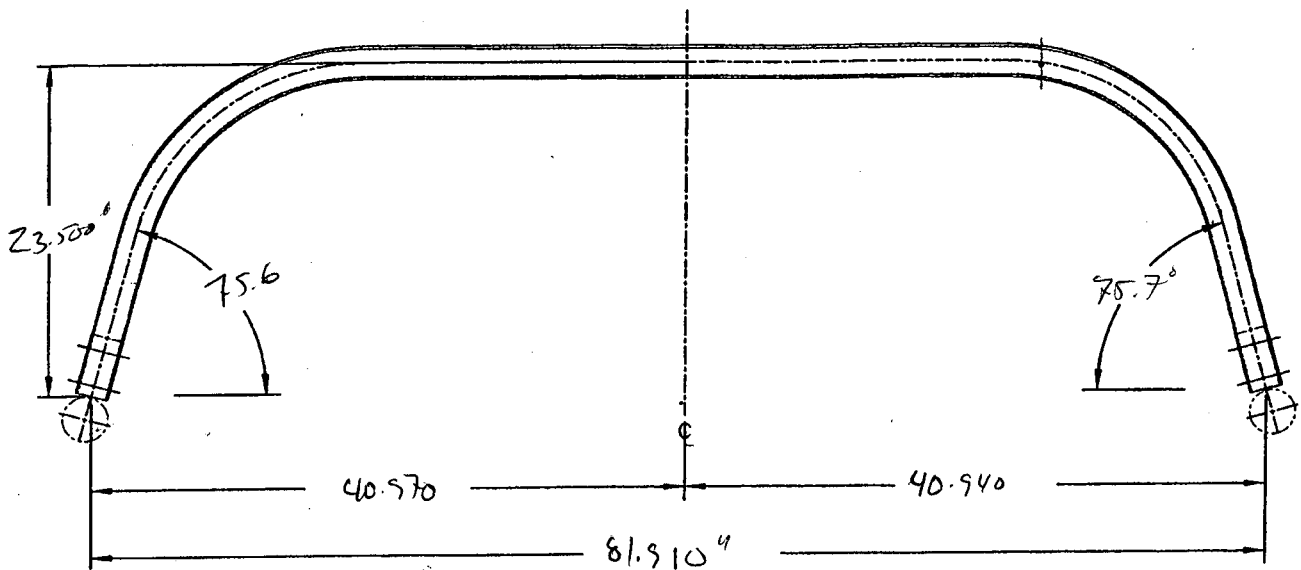
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	
Description: Crosstube High Fwd (AS350/355)		Part Number:	D350-748-101
Inspection Dwg: D350-748-141 Rev: E			Page 1 of 1

Required Dimension	Min	Max
Height	23.13	23.37
1/2 Span	40.78	41.02
Angle	75	77
Total Span	81.56	82.04



measurements After stress relief

Comments
<i>twist 2.169</i>

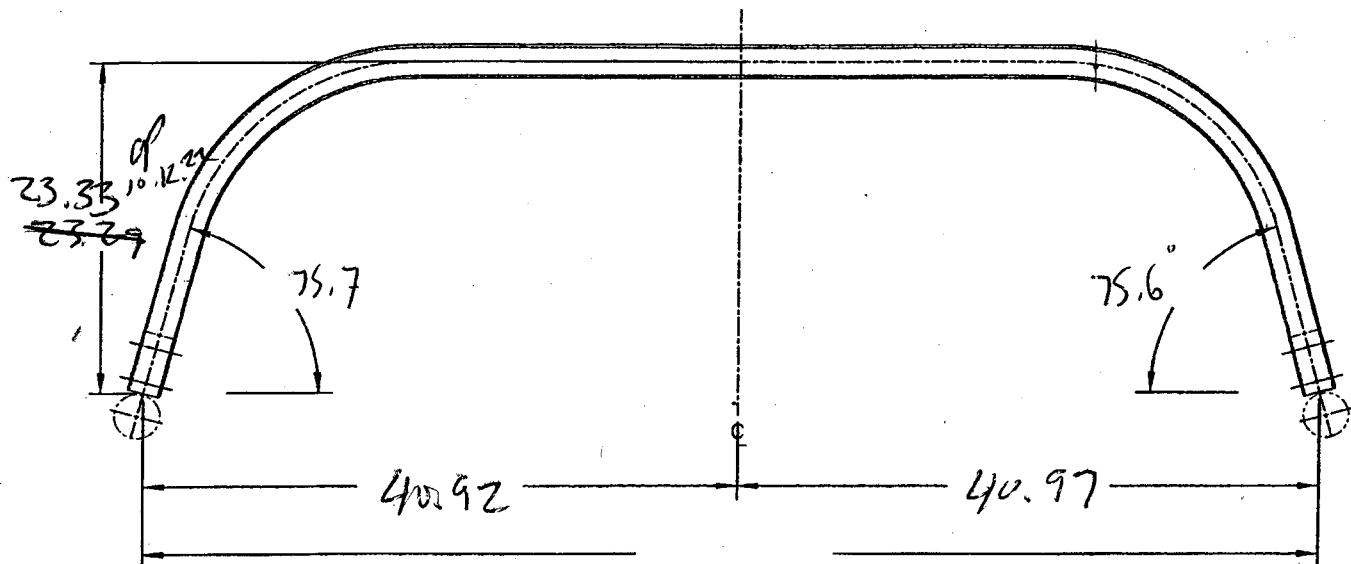
QC15 Inspection	<i>S</i>
Date	<i>10/12/13</i>

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	10.08.23	Dwg Rev updated	KJ	

11/10/23

DART AEROSPACE LTD		Work Order:	
Description: Crosstube High Fwd (AS350/355)		Part Number:	D350-748-101
Inspection Dwg: D350-748-141 Rev: E		Page 1 of 1	

Required Dimension	Min	Max
Height	23.13	23.37
1/2 Span	40.78	41.02
Angle	75	77
Total Span	81.56	82.04



Comments

QC15 Inspection	<i>P</i>
Date	<i>10.12.22</i>

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	10.08.23	Dwg Rev updated	KJ	<i>[Signature]</i>

Item	Qty -141	Part Number	Description
1	X	D350-748-141	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
2	1	D6017-115	CROSSTUBE
3	2	D3502-1	SUPPORT
4	2	D2856-400-710	ABRASION STRIP
5	1	AELS-1032-225	INSERT
6	1	NAS1149D0363J	WASHER (OR AN960JD10)
7	2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
8	1	MS27039-1-10	SCREW

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6017-115
FINISHED LENGTH = 110.270±0.06
- 2) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D350-748-141" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 30.45 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.
- 9) BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING.
- 12) INSTALL D2856-400-710 ABRASION STRIPS WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 13) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- 14) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 63592

APR 11-04

OK [Signature]

UNDER REVIEW

APR 10-13

RELEASED

2009-10-29

E	REVISE GENERAL NOTES: UPDATE TO CURRENT ADD STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A6-3); TOLERANCES (ZN C6-3, D1-3)	RF	09.09.30
D	MAG. PARTICLE AND CAD PLATE AS MFD.	CP	06.10.31
C	ADD CAD PLATING	CP	06.08.14
B	ADD D6017-115 & PRIME AND PAINT	CP	06.06.30
A	NEW ISSUE	CP	06.03.31
REV.	DESCRIPTION	BY	DATE
DESIGN	<i>[Signature]</i>		
DRAWN	RF		
CHECKED	<i>[Signature]</i>		
MFG. APPR.	<i>[Signature]</i>		
APPROVED	<i>[Signature]</i>		
DE APPR.	<i>[Signature]</i>		
DATE	09.09.30		

DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWING NO. D350-748-141	REV. E SHEET 1 OF 4
TITLE CROSSTUBE (AS 350/355 HI FWD)	SCALE NTS
COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL, AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

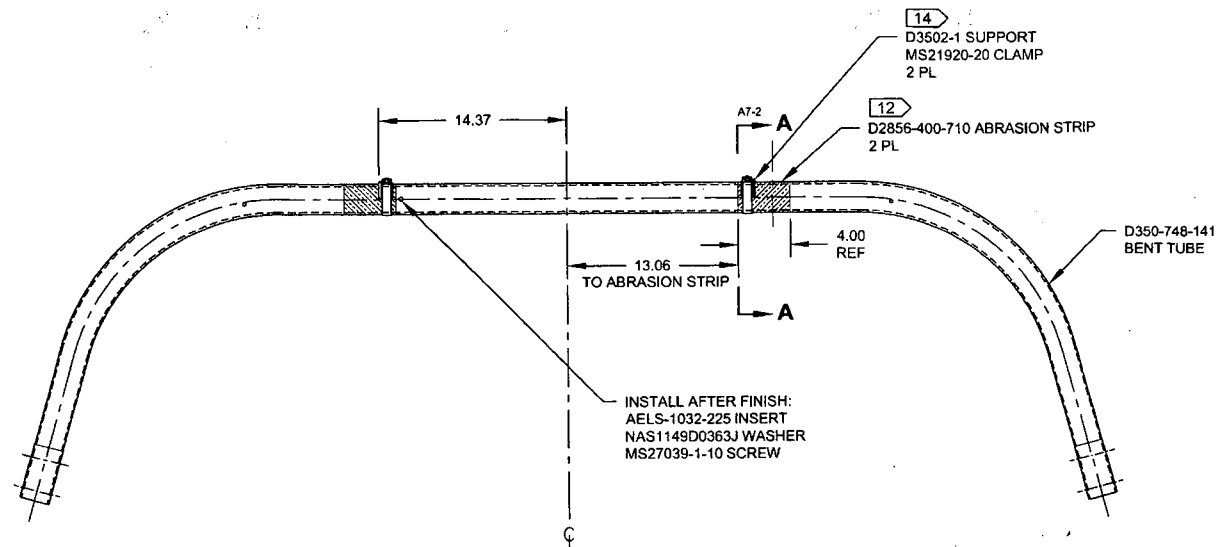
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

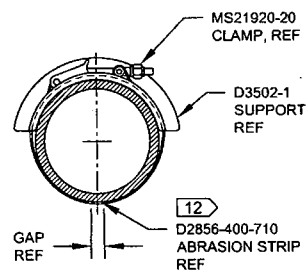
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



**D350-748-141
ASSEMBLY DETAIL**



SECTION A-A D4-2
SCALE 4X

w/o 43592

RELEASED
2009-10-29

DESIGN	RF	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	RF	DRAWING NO.	REV. E
MFG. APPR.	RF	D350-748-141	SHEET 2 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	09.09.30	<small>COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE REPRODUCED FOR ANY PURPOSE OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD</small>	

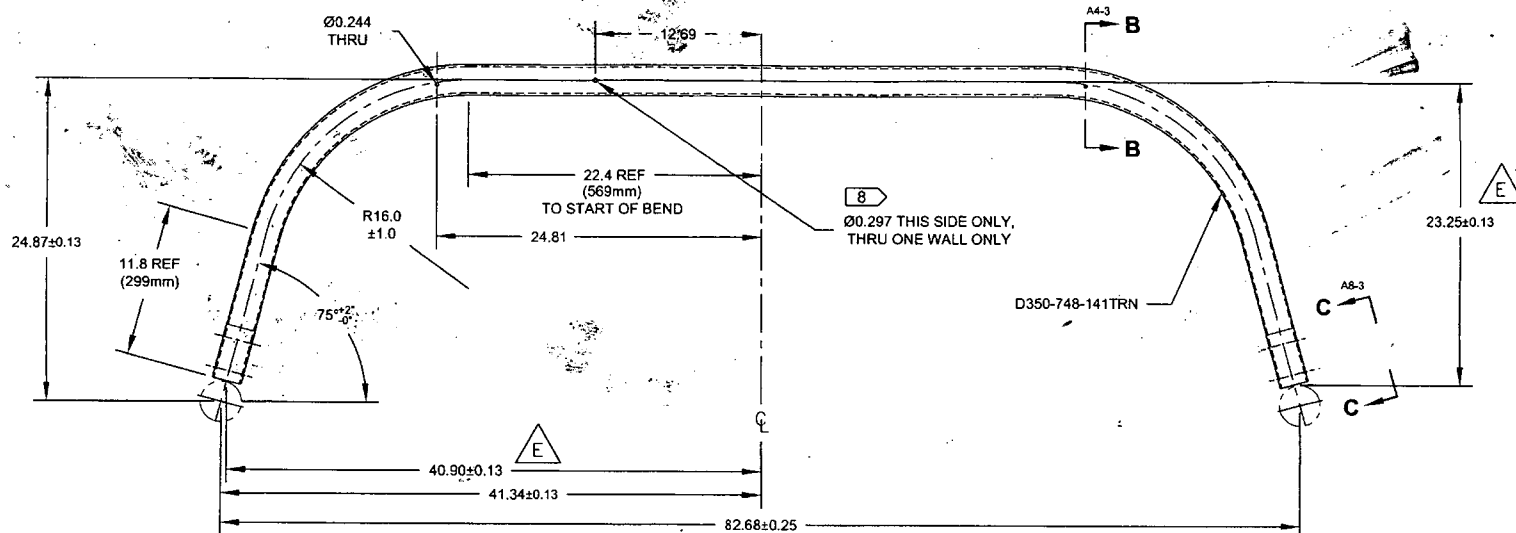
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

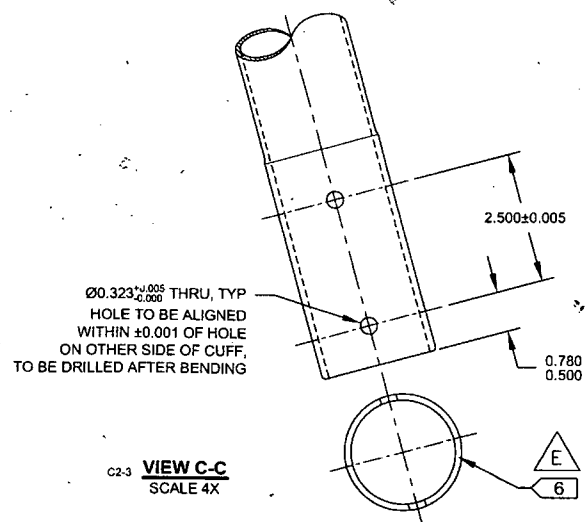
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

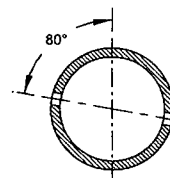
NOTE: Date & initial all entries



D350-748-141
BENDING AND DRILLING DETAIL 10



C2-3 **VIEW C-C**
 SCALE 4X



SECTION B-B D3-3
 SCALE 4X

w/o 63592

RELEASED
 2009-10-29

DESIGN	97	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	97	DRAWING NO.	REV. E
MFG. APPR.	97	D350-748-141	SHEET 3 OF 4
APPROVED	10	TITLE	SCALE
DE APPR.	10	CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2005 BY DART AEROSPACE LTD	
THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.			

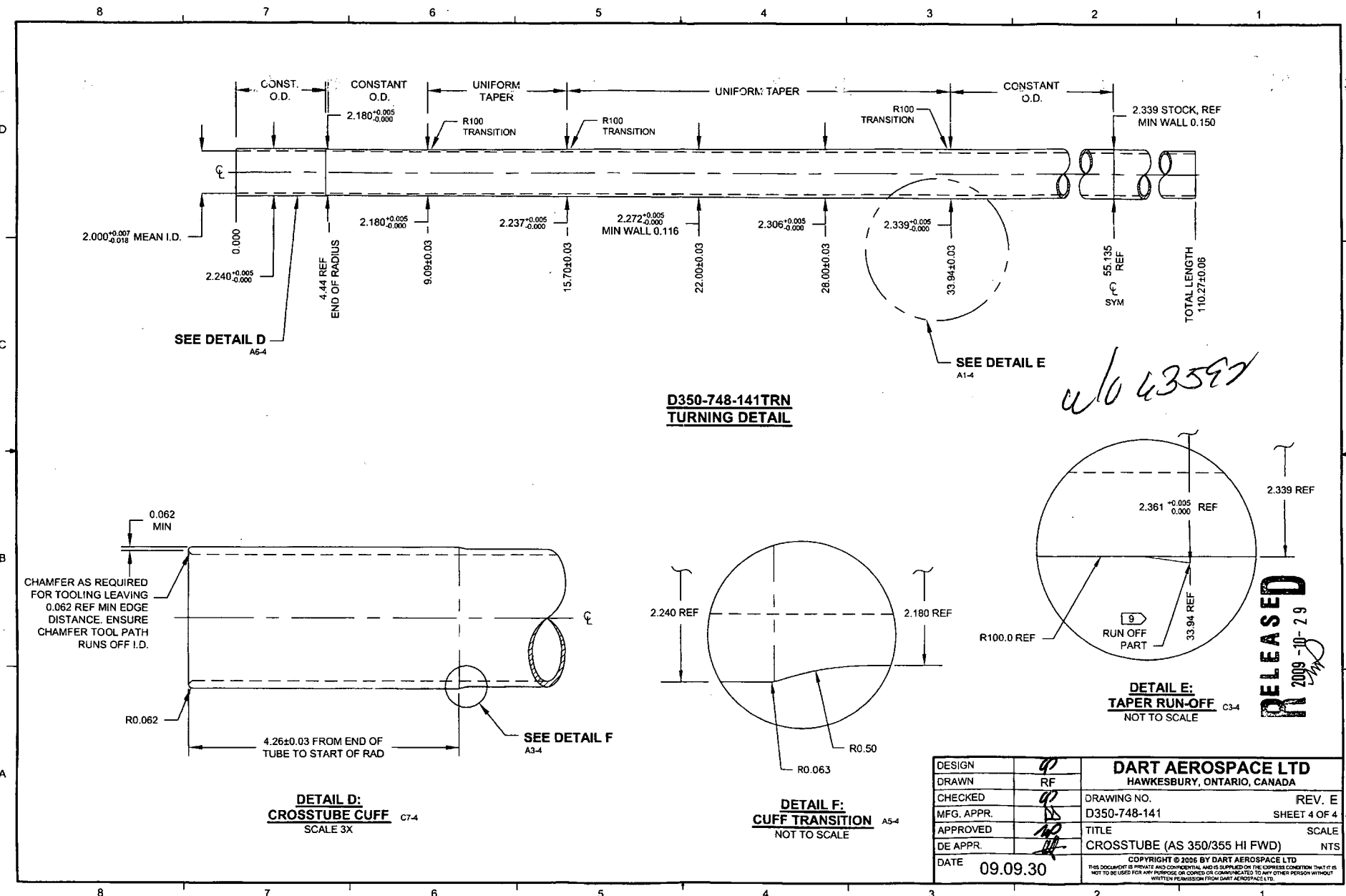
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



**D350-748-141TRN
TURNING DETAIL**

u/o 43592

RELEASED
2009-10-29

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



LIQUID PENETRANT TEST REPORT

P- 15199

PAGE 1 OF 1

CLIENT DART AEROSPACE DATE DEC. 21-2010 TIME AM ☒ PM ☐
ATTENTION LINDA LACELLE ACUREN JOB NO. 188-10-0971
ADDRESS 1270 ABERDEEN ST. PO/VO NO. 13181
HAWKESBURY CNT. WORK LOCATION HAWKESBURY PLANT
ACCEPTANCE STD. ASTM 1417 REV./DATE 2005
PROJECT SIX CROSS TUBES INSPECT + REINSPECT
ITEM(S) EXAMINED AFTER DEFLECTION PROCESS.

JOB DESCRIPTION WET FLOURSCENT LIQUID PENETRANT INSPECTION PROCEDURE NO. LT-002 REV./DATE 2008 TECHNIQUE NO. LT-002 REV./DATE 2008
PART NO. — MATERIAL STEEL THICKNESS VARIOUS
SCOPE CARRIED OUT 100% EXTERNAL

TEST DETAILS

METHOD ☒ FLUORESCENT ☐ VISIBLE ☒ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED
FAMILY BRAND MAGNA FLUX BLACK LIGHT S/N 16459 ☐ OUTPUT > 1000 μ W/cm² ☐ AMBIENT < 2 fc
PENETRANT 2L67 MINIMUM DWELL TIME 45 MIN. LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER H2O MINIMUM DRY TIME >10 MIN. OTHER LABINO
DEVELOPER SKD52 MINIMUM DWELL TIME 10 MIN. LIGHT METER S/N 1098866 CAL DUE DATE OCT-19-2011
DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY

TEST SURFACE

SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☒ MACHINED ☐ SHOT BLASTED ☒ CLEAN BARE METAL
SURFACE TEMPERATURE ☐ < -4°C/20°F ☐ -4°C/20°F TO 10°C/50°F ☒ 10°C/50°F TO 52°C/125°F ☐ > 52°C/125°F

RESULTS- (☐ METRIC ☐ IMPERIAL)

PRIGR
1 - CROSS TUBE-W.O. 61768 ✓
1 - CROSS TUBE-W.O. 61767 ✓
1 - CROSS TUBE-W.O. 61770 ✓
1 - CROSS TUBE-W.O. 61769 ✓
1 - CROSS TUBE-W.O. 63592 ✓
1 - CROSS TUBE-W.O. 63591 ✓
1 - CROSS TUBE-W.O. 61768 ✓
1 - CROSS TUBE-W.O. 61767 ✓
1 - CROSS TUBE-W.O. 61770 ✓
1 - CROSS TUBE-W.O. 61769 ✓
1 - CROSS TUBE-W.O. 63592 ✓
1 - CROSS TUBE-W.O. 63591 ✓
CROSS TUBES REINSPECTED
AFTER DEFLECTION
RESULTS AS FOLLOWS.
10.12.21

Scope of Services
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.
Standard of Care
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE R. Titley DTR # E63236
TECHNICIAN (SIGNATURE): [Signature] REPORT REVIEWED BY:
NAME (PRINT): Mike Johnston NAME INITIALS
1ST TECHNICIAN 2ND TECHNICIAN
CGSB LEVEL 2 SNT LEVEL — CGSB LEVEL — SNT LEVEL —
CGSB REG. NO. 6606 CGSB REG. NO. —

W/O: 63592		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector
10.12.21	140.5	- DEFLECT TUBE TO <u>3500</u> lbs FOR 1 MINUTE. - RE-MEASURE HEIGHT & WIDTH.	CP	10.12.21		CP 10.12.21 QSI 042	
10.12.21	140.6	NDT Tube Following deflection testing.				CP 10.12.21 QSI 042	

Part No: D350-748-101 PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

**CERTIFICATE OF
CONFORMANCE**

**CADORATH PLATING CO. LTD.
2150 LOGAN AVENUE
WINNIPEG, MANITOBA R2J-0J1**

DATE: Jan-14-2011

CONSIGNED TO: Dart Aerospace Ltd.
1270 Aberdeen St
Hawksbury, ON K6A 1K7

W/O #: 101005

INVOICE #: 52908

**CONTRACT OR
PURCHASE ORDER #** 13189

DESCRIPTION: SKID

QTY 1

P/N # d350-748-101

S/N # B63592

STRESS RELIEF BAKE @375 DEG. BAKE HEAT CHART #11-5. MPI
INSPECTED IAW ASTM-E-1444. CADMIUM PLATED IAW AMS-QQ-P-
416C, TYPE 2 YELLOW, CLASS 1. BAKE HEAT CHART #11-24.

S. Suleyev

**CERTIFICATE: I certify that the items indicated here on have
been inspected and tested and conform to all specifications
and requirements detailed on the contract or purchase order.**

Approved Inspector:



[Handwritten signature]



LIQUID PENETRANT TEST REPORT

P- 05496

CLIENT: DART AEROSPACE DATE: JAN/26/2011 PAGE: 1 OF 2
ATTENTION: LINDA LACELLE / CHANTAKE / IAN ACUREN JOB NO.: 188-11- TIME: AM ☒ PM ☐
ADDRESS: 1270, ABERDEN ST. PO/WO NO.:
HAWKESBURY, ON WORK LOCATION: AS ADDRESS
ACCEPTANCE STD.: ASTM 1417/BSI-038 REV./DATE: 2005
PROJECT: WET FLUO PENETRANT INSPECTION ON 14 "CROSSTUBES"; 4 "COLLECTIVE BELL CRACK"
ITEM(S) EXAMINED: SEE BELOW

OB DESCRIPTION: PROCEDURE NO. LT-008 REV./DATE: 2008 TECHNIQUE NO. LT-008 REV./DATE: 2008
ART NO.: MATERIAL: ALODINE ALUMINUM THICKNESS: N/A
SCOPE: PERFORMED A WET FLUORESCENT LIQUID PENETRANT INSPECTION ON 100% OF THE EXTERNAL SURFACE

TEST DETAILS
METHOD: ☒ FLUORESCENT ☐ VISIBLE ☒ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED
AMILY BRAND: MAGDA FLUX BLACK LIGHT S/N: 13798 OUTPUT: > 1000 μ W/cm² AMBIENT: < 2 fc
PENETRANT: 26-67 MINIMUM DWELL TIME: 10 MIN. LIGHTING EQUIP.: ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT: > 100 fc @ SURFACE
PENETRANT REMOVER: H₂O MINIMUM DRY TIME: > 10 MIN. OTHER:
DEVELOPER: SKD-52 MINIMUM DWELL TIME: 10 MIN. LIGHT METER S/N: CAL DUE DATE: FEB/25/2011
DEVELOPER TYPE: ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY

TEST SURFACE
SURFACE CONDITION: ☐ AS GROUND ☐ AS WELDED ☐ MACHINED ☐ SHOT BLASTED ☒ CLEAN BARE METAL
SURFACE TEMPERATURE: ☐ < -4°C/ 20°F ☐ -4°C/ 20°F TO 10°C/ 50°F ☒ 10°C/ 50°F TO 52°C/ 125°F ☐ > 52°C/ 125°F

RESULTS-		(<input type="checkbox"/> METRIC <input checked="" type="checkbox"/> IMPERIAL)	
ITEM	COMMENTS	ACCEPT	REJECT
1	4 X "COLLECTIVE BELL CRACK"	✓	
2	CROSS-TUBE W.O. ID 63591	✓	
3	CROSS-TUBE W.O. ID 63592	✓	
4	CROSS-TUBE W.O. ID 63746	✓	
5	CROSS-TUBE W.O. ID 63747	✓	
6	CROSS-TUBE W.O. ID 63748	✓	
7	CROSS-TUBE W.O. ID 63749	✓	

SEE Page 2 of 2

Scope of Services
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.
Standard of Care
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES
CLIENT REPRESENTATIVE: Ian Titley DTR # E63121
TECHNICIAN (SIGNATURE): [Signature] REPORT REVIEWED BY:
NAME (PRINT): YVES DESROSIERS NAME: INITIALS:
CGSB LEVEL: 2 1ST TECHNICIAN CGSB LEVEL: 2 2ND TECHNICIAN
CGSB REG. NO: 3049 CGSB REG. NO:



RAPPORT D'INSPECTION NON DESTRUCTIVE

RAPPORT#

(SUITE)

REPORT# P-05496

PAGE 2 DE 2

CLIENT DART AEROSPACE
ATTENTION LINDA LAKEUE / CHANTAGE / IANDATE JAN/26/2011HEURE ☒ AM ☐ PMACUREN W/O : 188-11-02103

RÉSULTATS

☐ MÉTRIQUE ☒ IMPÉRIALE

ITEM	COMMENTS	ACCEPT	REJECT	ITEM ID
8	CROSS TUBE W.O. ID 61763	✓		ITEM ID D350-748-101(A)
9	CROSS TUBE W.O. ID 61764	✓		D350-748-101(H.F.)
10	CROSS TUBE W.O. ID 61765	✓		D350-748-101(H.F.)
11	CROSS TUBE W.O. ID 61766	✓		D350-748-101(H.F.)
12	CROSS TUBE W.O. ID 61767	✓		D350-748-201(H.A.)
13	CROSS TUBE W.O. ID 61768	✓		D350-748-201(H.A.)
14	CROSS TUBE W.O. ID 61769	✓		D350-748-201(H.A.)
15	CROSS TUBE W.O. ID 61770	✓		D350-748-201(H.A.)

— NO REJECTABLE INDICATION WAS DETECTED, AS PER APPLICABLE STANDARDS

Étendue des services

L'entente selon laquelle le Groupe Acuren Inc. Exécute les services ne concerne que les énoncés par écrit. En aucune circonstance ces services ne s'étendent au-delà de l'exécution des services demandés. Il est entendu que toutes les descriptions, les observations et les expressions d'opinions faites par Acuren reflètent les opinions ou les observations de l'entreprise fondées sur l'information et les hypothèses fournies par le propriétaire/opérateur, et elles ne constituent pas des déclarations ou des garanties ou ne peuvent être interprétées comme constituant. Le groupe Acuren Inc. N'assume aucune des responsabilités du propriétaire/opérateur, et le propriétaire/opérateur conserve la responsabilité entière des décisions prises en matière d'ingénierie, de fabrication, de réparation et d'usage à partir de l'information ou des données fournies par Acuren en rapport avec les services décrits dans les présentes ne peuvent excéder le coût des services rendus.

Norme de Diligence

Dans l'exécution des services, le Groupe Acuren inc. Applique le degré de diligence, le soin et la compétence normalement exercés dans des circonstances semblables par d'autres fournisseurs de ce type de services opérant dans la même localité ou dans une localité similaire. Aucune autre garantie, implicite ou explicite, n'est faite ou voulue par le Groupe Acuren Inc.

SIGNATURES

REPRÉSENTANT CLIENT

TECHNICIEN (SIGNATURE):

NOM (MOULÉ):

ONGC NIVEAU

ONGC N° REGISTRATION

SNT NIVEAU

SNT N° REGISTRATION

2nd TECHNICIEN

ONGC NIVEAU

ONGC N° REGISTRATION

FTJ#: E63121

RAPPORT

RÉVISÉ PAR:

NOM

INITIALES

REFERENCE ONLY**5.0 PARTS LIST**

Qty -101	Qty -201	Part Number	Description
X		D350-748-101	CROSSTUBE INSTALLATION, AS 350/355 HIGH FWD
	X	D350-748-201	CROSSTUBE INSTALLATION, AS 350/355 HIGH AFT
1		D350-748-141	CROSSTUBE ASSEMBLY, AS 350/355 HIGH FWD
	1	D350-748-241	CROSSTUBE ASSEMBLY, AS 350/355 HIGH AFT
*2	*2	D3502-1	SUPPORT
*2	*2	D2856-400-710	ABRASION STRIP
*1	*1	AELS-1032-225	INSERT
*2	*2	MS21920-20	CLAMP
*1	*1	MS27039-1-10	SCREW
*1	*1	AN960JD10	WASHER
4	4	D3500-1	SADDLE
16	16	D3501-1	BUSHING
16	16	AN4-6A	BOLT
8	8	AN4-41A	BOLT
4	4	AN5-32A	BOLT
32	32	AN960JD416	WASHER
8	8	AN960JD516	WASHER
24	24	MS21042L4	NUT (OR MS21042-4)
4	4	MS21042L5	NUT (OR MS21042-5)

* REFERENCE ONLY. PARTS ARE INCLUDED IN D350-748-141/241 ASSEMBLIES ABOVE

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